

### **REMARKS**

An Excess Claim Fee Payment Letter is submitted herewith for one (1) excess independent claim and one (1) excess total claim.

Claims 9-16 and 20-32 are all the claims presently pending in the application. Claim 9 has been amended to more particularly define the claimed invention. Claims 20-32 have been added to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicant gratefully acknowledges that claims 12-13 would be allowable if rewritten in independent form. However, Applicant respectfully submits that all of the claims are allowable.

Applicant gratefully acknowledges the Examiner's indication that claims 12-13 would be allowable if rewritten in independent form. However, Applicant respectfully submits that all of the claims are allowable.

Claims 14-15 stand rejected under 35 U.S.C. §112, second paragraph as allegedly being indefinite.

Claims 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Otani et al. (U. S. Patent No. 6,115,156), in view of Alleged Prior Art Figure 1. Claims 14-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Otani et al., in view of Prior Art Figure 1, and further in view of Bergano (U. S. Patent No. 6,137,604).

These rejections are respectfully traversed in view of the following discussion.

#### **I. THE CLAIMED INVENTION**

The claimed invention (e.g., as recited in the exemplary embodiment of claim 9) is directed to an optical communication system including a first optical fiber connected to a first station which transmits an optical signal for a plurality of channels, a second optical fiber connected

to a second station, a third optical fiber connected to a third station, and a light branching apparatus which includes an optical splitter which splits the optical signal into at least a first optical channel signal on a first channel of the second optical fiber and a plurality of second optical channel signals on a plurality of second channels of the third optical fiber.

Importantly, the light branching apparatus also includes a first wavelength dispersion compensator formed on the second optical fiber, which is provided for the first channel and compensates wavelength dispersion of the first optical channel signal due to the optical splitter.

Another exemplary aspect of the claimed invention (e.g., as recited in claim 20) is directed to an optical communication system including a light transmitter station, a first light receiver station in communication with the light transmitter station via an optical transmission line comprising a plurality of optical fibers, a light branching apparatus formed on the optical transmission line between the light transmitter station and the first light receiver station, and a second light receiver station in communication with the light transmitter station via the optical transmission line. A path between the light transmitter station and the first light receiver station includes a main transmission path, and a path between the light branching apparatus and the second light receiving station includes a sub-transmission path.

Importantly, in this exemplary aspect, the light branching apparatus includes a first wavelength dispersion compensator for the main transmission path, and a second wavelength dispersion compensator for the sub-transmission path.

Another exemplary aspect of the claimed invention (e.g., as recited in claim 30) is directed to an optical communication system including a first station transmitting an plurality of optical signals having different wavelengths, respectively, second and third stations in communication with the first station, and a light branching apparatus including an optical splitter/combiner which receives the plurality of optical signals from the first station, and branches the plurality of optical signals such that one of the plurality of optical signals is branched to the second station and a remainder of the plurality of optical signals is branched to the third station.

In this exemplary aspect, the second station transmits an optical signal having a same

wavelength as the one of the plurality of optical signals, to the light branching apparatus, and the optical splitter/combiner combines the optical signal from the second station with the remainder of the plurality of optical signals to form a combined optical signal, and forwards the combined optical signal to the third station. Importantly, the light branching apparatus comprises a first wavelength dispersion compensator for the one of the plurality of optical signals branched to the second station, and a second wavelength dispersion compensator for the optical signal from the second station.

Another exemplary aspect of the claimed invention (e.g., as recited in claim 31) is directed to a light branching apparatus for an optical communication system. The apparatus includes a plurality of optical splitter/combiners which receives a plurality of optical signals from a first station, and branches the plurality of optical signals such that a first portion of the plurality of optical signals is branched to a second station and a second portion of the plurality of optical signals is branched to a third station, an optical switch which switches a transmission path between a first transmission path between the first station and the second station, and a second transmission path between the first station and the third station.

Importantly, in this exemplary aspect, the apparatus includes first and second wavelength dispersion compensators which are formed in the second transmission path and compensate for a wavelength dispersion due to a change of transmission path length when the transmission path is switched by the optical switch between the first and second transmission paths.

Conventionally, equalizing fibers are used to “sandwich” a light branching apparatus in order to prevent an imbalance in length (Application at page 7, lines 9-17). However, this results in many fibers being needed, and the installation of these equalizing fibers is troublesome and time-consuming.

The claimed invention, on the other hand, includes a light branching apparatus having a first wavelength dispersion compensator formed on the second optical fiber, which is provided for the first channel and compensates wavelength dispersion of the first optical channel signal due to the optical splitter (Application at Figures 3-4; page 15, lines 14-24). This feature makes it easy to install the light branching apparatus in a desired portion of a

transmission path.

## **II. THE 35 USC § 112, SECOND PARAGRAPH REJECTION**

The Examiner alleges that claims 14-15 are indefinite. Applicant submits, however, that these claims are not indefinite.

Specifically, Applicant notes that these claims were amended by a Preliminary Amendment filed with this Application on January 29, 2004, to replace the terms “said third” in claim 14, and “said fourth” in claim 15, with “another”.

Thus, Applicant respectfully submits that these claims are clear and not indefinite, as alleged by the Examiner.

In view of the foregoing, the Examiner is respectfully requested to withdraw this rejection.

## **III. THE PRIOR ART REFERENCES**

### **A. The Otani Reference and Alleged Prior Art Figure 1**

The Examiner alleges that Otani would have been combined with alleged prior art Figure 1 to form the invention of claims 9-11. Applicant submits however, that these references would not have been combined and even if combined the combination would not teach or suggest each and every element of the claimed invention.

Otani discloses a first wavelength dispersion compensator formed on said second optical fiber, which is provided for said first channel and compensates wavelength dispersion of said first optical channel signal due to said optical splitter (Otani at Abstract).

The alleged prior art Figure 1 illustrates a conventional optical fiber communication system which includes optical transmission end station 11, optical reception end station 12, light branching apparatus 13, and transmission and reception end station 14 (Application at Figure 1).

Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, contrary to the Examiner's allegations, neither of these references teach or suggest their combination.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, Applicant submits that neither Otani, nor the alleged prior art Figure 1, nor any alleged combination thereof, teaches or suggests "*a first wavelength dispersion compensator formed on said second optical fiber, which is provided for said first channel and compensates wavelength dispersion of said first optical channel signal due to said optical splitter*", as recited, for example, in claim 9.

As explained in the present Application, unlike conventional apparatuses in which equalizing fibers are used to "sandwich" a light branching apparatus in order to prevent an imbalance in length, the claimed invention includes a light branching apparatus having a first wavelength dispersion compensator formed on the second optical fiber, which is provided for the first channel and compensates wavelength dispersion of the first optical channel signal due to the optical splitter (Application at Figures 3-4; page 15, lines 14-24). This feature makes it easy to install the light branching apparatus in a desired portion of a transmission path.

Clearly, these features are not taught or suggested by Otani. Indeed, the Examiner attempts to equate the first equalizing fiber 2 in Otani with the first wavelength dispersion compensator in the claimed invention. This is clearly incorrect.

In fact, the Otani multiplexer is completely unrelated to the light branching apparatus of the claimed invention. Specifically, Applicant would point out that the equalizing fiber 1 in Otani is on optical fiber 1 which is completely unlike the claimed invention. That is, the equalizing fiber 2 in Otani is **not on a second optical fiber, as recited in claim 9**. Certainly, the fiber 2 is not provided for a first channel and does not compensate wavelength dispersion of the first optical channel signal due to the optical splitter.

Indeed, Otani explains the operation of the demultiplexer which makes clear that it is completely unrelated to the claimed light branching apparatus. Specifically, Otani states that

“[t]he length of the equalizing fibers could be decreased ... because the respective equalizing fibers 23, 24 and 25 are serially disposed, and because the wavelength-division multiplexed optical signals inputted to the **respective optical filters 16, 17 and 18 are compensated for dispersion not only by the preceding equalizing fiber but also by equalizing fibers disposed upstream thereof**” (emphasis added) (Otani at col. 3, lines 49-56).

Clearly, Otani is has a different structure and operates on a different principle than the claimed invention. Indeed, the claimed invention does not necessarily utilize such a serial configuration of equalizing fibers as in Otani.

In fact, the Examiner expressly concedes that Otani does not teach or suggest that equalizing fiber 2 compensates for wavelength dispersion of a first optical channel signal due to an optical splitter, but alleges that this would have been inherent or obvious. However, Applicant submits that this is clearly not correct.

In fact, **Otani does not even consider an effect of a light branching path on wavelength dispersion compensation.** That is, Otani is similar to the conventional systems discussed in the Application (e.g., see Application at page 2, line 21-page 3, line 4) which do not consider light branching in compensating for wavelength dispersion. Thus, like conventional systems, dispersion compensation would not be sufficient because “when a branch path is provided a the part of the transmission path, the length of the transmission path is different between the main path and the branch path” (Application at page 3, lines 1-3).

Again, **nowhere is this even recognized by Otani.** Thus, certainly, Otani does not teach or suggest compensating for wavelength dispersion of the first optical channel signal due to the optical splitter.

Further, the alleged prior art Figure 1 clearly does not teach or suggest the novel features of the claimed invention. Indeed, as noted above, this figure merely illustrates a light branching apparatus 13. Nowhere does this figure teach or suggest that the light branching apparatus includes a wavelength dispersion compensator formed on the second optical fiber. Certainly, nowhere does the figure teach or suggest compensating for wavelength dispersion of the first optical channel signal due to the optical splitter. Thus, Figure 1 clearly fails to make up for the deficiencies of Otani.

Therefore, Applicant submits that these references would not have been combined and

even if combined the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

**B. The Bergano Reference**

The Examiner alleges that the alleged Otani/Figure 1 combination would have been further combined with Bergano to form the invention of claims 14-16. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Bergano discloses a method for managing dispersion in a wavelength division multiplexed (WDM) optical transmission system (Bergano at Abstract).

However, Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to different problems and solutions.

Further, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

Indeed, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. In fact, contrary to the Examiner's allegations, neither of these references teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, Applicant submits that neither Otani, nor the alleged prior art Figure 1, nor Bergano, nor any alleged combination thereof teaches or suggests "*a first wavelength dispersion compensator formed on said second optical fiber, which is provided for said first channel and compensates wavelength dispersion of said first optical channel signal due to said optical splitter*", as recited, for example, in claim 9. As explained in the present Application, in the claimed invention, a worker can simply install the light branching apparatus in a desired location of a transmission path (e.g., to provide sufficient wavelength

dispersion compensation) (Application at page 15, lines 14-24).

Clearly, these features are not taught or suggested by Bergano. Indeed, Applicant notes that the Examiner is not relying on Bergano as allegedly teaching this feature, but instead relies on Bergano as allegedly disclosing another feature.

Further, the Examiner surprisingly attempts to equate the equalizing fibers 205<sub>1</sub> to 205<sub>N</sub> in Bergano with wavelength dispersion compensators in the claimed invention. This is clearly incorrect.

Indeed, Bergano states that “[t]he dispersion in each of the plurality of compensating fibers 205<sub>1</sub>, 205<sub>2</sub>, 205<sub>3</sub>, ... 205<sub>N</sub> is selected so that the average chromatic dispersion of the concatenated transmission spans 104 upstream from the dispersion compensator 105 and the equalizing sections 202 and 205 are substantially returned to zero at each of the center wavelengths  $\lambda_N$ ’ (Bergano at col. 4, lines 20-26). Thus, nowhere does Bergano teach or suggest a dispersion compensator formed on a second optical fiber (e.g., an optical fiber connected to a second station), and certainly does not teach or suggest that the compensating fibers compensate wavelength dispersion of a first optical channel signal due to an optical splitter.

Therefore, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, Applicant respectfully request that the Examiner withdraw this rejection.

#### **IV. FORMAL MATTERS AND CONCLUSION**

In view of the foregoing, Applicant submits that claims 9-16 and 20-32, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit

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any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,



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